PROBLEMS.

141. By William Hoover, Bellefontaine, Ohio. —Let ABC be any plane triangle, R the radius of its circumscribing circle, r' the radius of the escribed circle opposite A, p_1, p_2, p_3 the perpendiculars from the center of the circumscribing circle upon a, b and c. show that $r' - R = p_2 + p_3 - p_1$.

142. By Marcus Baker, Washington, D. C. — In a plane triangle ABC, AO' is drawn bisecting the angle A; from O', the center of the escribed circle, a perpendicular to AO' is drawn, meeting AB produced in T'', and from T'' a perpendicular to AB is drawn, meeting AO' produced in O''; with O'' as center and $O''T''$ as radius a circle is described; prove that this circle is tangent to the circle circumscribed about the triangle ABC.

143. From Exam'n Problems, Hamilton College.—Required the area of the triangle formed by the tangent to the curve whose equation is $x^{\frac{2}{3}} + y^{\frac{2}{3}} = r^{\frac{2}{3}}$ and the axes of xy.

144. By O. H. Merrill, Rodman, N. Y.—A cylindrical post, diameter d, stands perpendicularly on a level plane with a rope, diameter d' and length l, attached to the bottom of the post and lying stretched on the plane. How far will a person walk who takes hold of the end of the rope and winds it around the post by walking around it always keeping the rope parallel to the plane and also keeping the coils on the post at a distance of $3d'$ from each other?

145. By Christine Ladd, Union Springs, N. Y.— The product of the lengths of tangents from the radical center of three circles on any pair of circles through the intersections of the given circles is equal to the product of the lengths of tangents from the same point on any pair of circles tangent to the given circles.

146. By D. J. Mc. Adam, Washington, Pa.—Given a semicircle and a circle, place the latter so that it will cut the former; what is the probability that its center will fall within the former?

147. By E. B. Seitz, Greenville, Ohio.—Two rods of equal length have their middle points connected by a string of half the length of one of the rods. If they be thrown on a level floor, what is the chance of their crossing?

148. By Artemas Martin, Erie, Pa.— A tortoise, whose shell is circular, radius a, is moving in a straight line at the uniform speed of m feet per minute, and a fly is running around on the edge of its shell at the uniform rate of n feet per minute.

Required the equation to the curve the fly describes in space.

149. From Todhunter's Integral Cal., p. 164, by request of H. Heaton.—Prove that

$$\int_0^{\frac{a}{2}} \frac{dx}{\sqrt{(2ax-x^2)}\sqrt{(a^2-x^2)}} = \frac{2}{3a} F\left(c\frac{\pi}{2}\right), \text{ where } c = \tfrac{1}{3}.$$

150. From the Journal of Progress. — An underwriter insures three vessels, the first an iron steamer, the second a steamer not of iron and the third a sailing vessel, at \$20,000, \$15,000, and \$10,000, respectively. One of them is known to have been burned at sea; and three persons, A, B, C, whose respective veracities are $\frac{3}{4}$, $\frac{4}{5}$, and $\frac{5}{6}$, report as follows: A, that the lost vessel was an iron steamer; B, that it was not a sailing vessel; and C, that it was a sailing vessel. Required the expectation of loss to the underwriter, the *a priori* probability of destruction by fire being twice as great in case of a steamer as of a sailing vessel.

BOOK NOTICES.

A Treatise on the Theory and Solution of Algebraical Equations. By John Macnie, A. M. A. S. Barnes and Company, N. Y., Chicago, & New Orleans. Octavo. 184 pages. 1876.

In this book the author presents the Theory of equations, Solution of equations by general formulas, Sturm's Theorem, Horner's method of approximation, an analysis of equations by Fourier's theorem, &c., in a concise and lucid manner.

Students of Algebra will not fail to be interested and instructed from a perusal of this book.

Interpolation and Adjustment of Series, By E. L. De Forest. New Haven. 1876.

This is a pamphlet of 50 pages and is a continuation of two other papers on the same subject which were published in the Annual Reports of the Smithsonian Institution, for the years 1871 and 1872.

ERRATUM.

On page 172, (Vol. III) line 6, for Put $r + x = \sqrt[n]{a}$, read, Put $r = \sqrt[n]{a}$.